

# Improved Nomenclature Efficiency Using Proposition Hierarchy

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## INTRODUCTION

Entry of individual medical names, locations and events do not by themselves necessarily communicate clinically important information. It is the unique grouping of terms that transmit information. When medical nomenclature is organized into objects (patella, aorta) and characterized with unique properties (fractures, dissections), a clinical proposition (fundamental unit of medical information) is created which provides information storage efficiency while preserving unambiguous, precise and specific representation of details. With the construction of unique propositions as fundamental units, efficient data recording and may be accomplished while avoiding redundancy which makes retrieval difficult. Hierarchical structures take advantage of proposition structures to accomplish efficient data storage and retrieval. We analyzed such a hierarchical system utilizing this proposition-based approach to determine the advantages and limitations when applied to information systems.

## METHODS

Logic theory was utilized as a contextual basis in which to analyze the process through which individual words and short phrases are combined to create medically useful propositions. The relative value of increasing proposition size on system efficiency was considered using propositions in a hierarchical data structure. These hierarchies are evaluated for their efficient utilization of decisions to characterize specific medically useful propositions. The clinical encounter is characterized as the intersection of hierarchies composed of propositions to determine the value of this approach in clinical medicine.

Finally, the hierarchical approach, composed of progressively more complex propositions is evaluated for efficiency of information entry to determine the potential value of such an approach. To accomplish this, we considered the situation in which 65,536 ( $2^{16}$ ) propositions are combined into progressively larger hierarchies.

## RESULTS

Under the constraint that information content and flexibility (entry and retrieval) must be maintained, increasing proposition size improves data retrieval efficiency. Redundancy is reduced or eliminated since there are fewer ways identical data can be entered. However, there is an inherent trade-off between the need for large numbers of relatively small propositions to represent clinical detail and the need to combine these into larger complex propositions to permit rapid and non-redundant data entry and retrieval. As proposition complexity increases, the number of complete phrases to choose between increases while the number of independent terms decreases. Consequently, an optimum balance between these conflicting needs to be realized. Nevertheless, the number of choices may remain quite large, depending on the complexity of the information being described. The hierarchical approach composed of complex propositions was found to reduce the number of decisions required to enter information by at least an order of magnitude and provided a context in which to view the clinical encounter.

## DISCUSSION

Use of propositions as medical information units provides efficient knowledge storage and transmission. In a hierarchy of medical propositions, rapid data management is accomplished while preserving data precision and uniqueness.